

METHOD AND APPARATUS FOR CONTINUOUS FLOW REDUCTION
OF MICROBIAL AND/OR ENZYMATIC ACTIVITY
IN A LIQUID PRODUCT USING CARBON DIOXIDE

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Abstract of the Disclosure

A continuous method using gaseous carbon dioxide or a pressurized flow of liquefied carbon dioxide is described to reduce microbial and/or enzymatic activity 10 in a liquid product. The carbon dioxide is combined with a pressurized flow of the liquid product, or the mixture is pressurized after the mixture is formed. The pressure and temperature in the flow regions are maintained at a level which is sufficient to keep the 15 carbon dioxide in a continuous liquid state, but which does not freeze the liquid product. The pressurized mixture of the carbon dioxide and liquid product flows through a reaction zone for a sufficient time to reduce harmful microorganisms and/or inactivate enzymes and 20 then enters one or more expansion stages wherein the pressure of the mixture flow is sufficiently decreased to vaporize the carbon dioxide for separation from the liquid product. If necessary, heat is applied in at least one of the expansion stages to prevent a freezing 25 of the mixture.